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NOTES ON GEOGRAPHIC DISTRIBUTION

Occurrence record of *Sus scrofa* Linnaeus, 1758 (Mammalia: Artiodactyla) at Estação Ecológica de Itirapina, São Paulo state, Brazil

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ABSTRACT: Invasive species are the second cause of biodiversity decline in the world. Among the many invasive species, the *Sus scrofa* (wild boar) is amongst those that cause more impacts. Our aim was to report the presence of the wild boar in the last remaining open area of Cerrado in the São Paulo state, Brazil. In September 2007 an individual was seen and tracks were also observed during the same period at the Estação Ecológica de Itirapina.

Invasive alien species are animals, plants or other organisms introduced into places out of their natural range of distribution, where they become established and disperse, generating a negative impact on the local ecosystem and species (IUCN 2009). Many invasive (alien) species are established in Brazil affecting terrestrial and aquatic environments. The spread of invasive species threatens global biodiversity (Clavero and García-Berthou 2005), economy and human health and is a complex challenge to be solved. The impact caused by invasive species on the native species usually occurs due to competition (Brown *et al.* 2002). Besides this, invasive organisms may also cause economic losses, increase predation of native and/or domestic species (Cadi and Joly 2004), and alter the habitat structure, the water regime of streams and rivers, which leads to physical and chemicals changes in the environment (Quintela *et al.* 2010). Moreover, the introduction of invasive species also increases the risk of new diseases that in some cases can cause extinction of native species. A Brazilian program for biodiversity conservation (PROBIO 2005) recorded 171 invasive species in Brazil, of which 63 (37%) are animals and 108 (63%) are plant species. Of the 63 invasive animal species, 25% are mollusks, 21% mammals, 17% crustaceans, 13% insects, 12% reptiles, 6% birds, 3% worms, and 3% amphibians according to this program.

Among the invasive mammal species, *Sus scrofa* is quite worrying and can be considered as one of the 100 worst invasive alien species (Deberdt and Scherer 2007), due to the economic damage and environmental it can cause in farms (Schley and Roper 2003) and reserves. Wild boars stomp and make bog pools that destroy native plants, alter water sources (streams, lakes), cause soil erosion and lesions on stems of trees when rubbing their teeth, facilitating the spread of invasive plants, affect the soil fauna and soil seed banks (GISD 2007; Bueno *et al.* 2011); besides preying on wild fauna (Cruz *et al.* 2005).

Besides the impacts mentioned above, the wild boar easily invades and becomes established in regions where potential native predators (*Panthera onca* and *Puma concolor*) are absent or present in low density; or where other mesopredators have difficulty in preying wild boar offspring. Because of this the wild boar may have greater success surviving in fragmented regions. However, these observations need to be studied in order to understand the relationship of the wild boar as a possible prey of Neotropical carnivora. In the Pantanal region, humans are effective predators of feral pigs. According to Desbiez *et al.* (2011), feral pigs (*S. scrofa*) are effectively acting as a replacement of native wildlife species for hunting, since they provide a constant, culturally acceptable, readily available and free source of meat and oil to local hunters. However, as discussed for natural predators and mentioned by Desbiez *et al.* (2011), until this moment there is no available information about how hunting of feral pigs can minimize the negative impact of this species on the ecosystem where it has been introduced.

The first hypothesis for the introduction of the wild boar in South America considered that this species was brought from Europe to the Argentine pampas around 1904 as a hunting option. Later, some wild boar individuals were taken in 1928 to Uruguay, where they had free access to disperse throughout the country (Quintela *et al.* 2010). In 1989, during a long period of drought that dropped the water level in the river Jaguarão, on the border between Brazil and Uruguay, the wild boar entered the Brazilian territory (Tiepolo and Tomas 2011). This species occupied the southern region (Rio Grande do Sul, Santa Catarina and Paraná states) and continued to disperse, reaching the states of São Paulo, Mato Grosso do Sul and Minas Gerais (Deberdt and Scherer 2007). However, legal and illegal captivity maintenance of wild boars contributed to the dispersal of species (Tiepolo and Tomas 2011), once in some regions animals escaped from commercial farms or were even released by unhappy farmers.

Thus, the aim of this report is to register the presence

of the wild boar at Estação Ecológica de Itirapina, a conservation reserve in the São Paulo state, Brazil. The Estação Ecológica de Itirapina is one of the last remaining open areas of Cerrado (campo cerrado, campo sujo and campo limpo) in the São Paulo state. Located between the municipalities of Itirapina and Brotas within the coordinates 22°00' – 22°15' S and 47°45' – 48°00' W, with an area of approximately 2.400 ha, it is inserted into a matrix of areas with pine (*Pinus* spp.), eucalyptus (*Eucalyptus* spp.), sugarcane (*Saccharum oficinarun*), orange (*Citrus aurantiun*) and exotic pastures (predominantly *Brachiaria decumbens*).

The record of wild boar in the Estação Ecológica de Itirapina occurred in September 2007 and was made through direct observation of a single animal (adult male) walking through a firebreak that comes along the gallery forest of the Rio do Lobo. Our record was obtained indirectly by identification of tracks in many of the firebreaks and roads in the area (Figure 1). The tracks were always from a solitary individual. According to Becker and Dalponte (1999) when tracks are correctly interpreted they can provide a secure identification of the species that produced them. Reports from the surrounding residents of the Estação Ecológica de Itirapina (São Paulo) suggest that the presence of this species in this region is due to releases made by one farmer; however the reasons for these releases remain unknown.

The presence of groups of wild boar in Itirapina region had already been reported by Deberdt and Scherer (2007), however, these authors did not provide information about the area, number, type or dates of the wild boar records for the São Paulo state. Thus, to the best of our acknowledgement, this is the first record in the area covered by the Estação Ecológica de Itirapina.

The vegetation in the Cerrado area of Estação Ecológica de Itirapina varies from 1 – 50 cm of height for campo sujo and 1 – 200 cm in campo cerrado phytophysiognomies (Sawaya unpublished data), which enables the undergrowth and small plant species to become predominant. According to Reatto *et al.* (1998) the different phytophysiognomies of the Cerrado are directly related to different soil characteristics. Thus, the areas of campo cerrado and campo sujo are made up of a lower proportion of clay soil and a higher proportion of sandy soils than forest areas, which results in a less stable soil (easier to excavate). In general, the same weakness found for soil and vegetation can also be observed for the invertebrate and vertebrate fauna of these environments (Quintela *et al.* 2010); which may result in a great impact of the wild boar in this area.

Proportionately there is a greater richness of birds on the Cerrado of Estação Ecológica de Itirapina than on a Cerrado area of the Federal District in Brazil, some of these species are threatened or endemic (Motta-Junior *et al.*

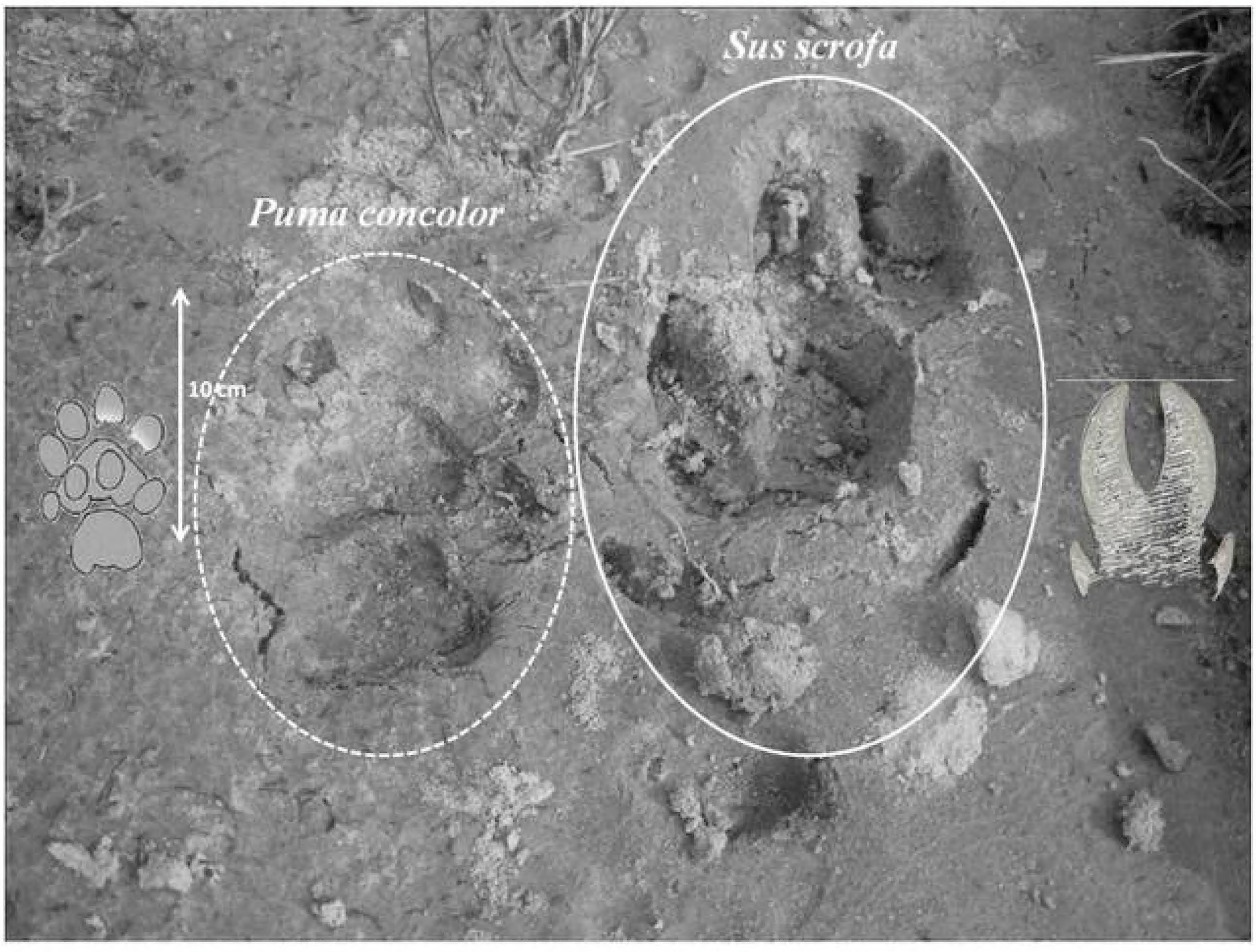

Figure 1. Tracks of *Puma concolor* and *Sus scrofa* recorded along a firebreak in the Estação Ecológica de Itirapina of the São Paulo state, Brazil.

2008) and many of them build their nests near to or in the soil; which makes the presence of the wild boar a concern. Moreover; wild boars have been observed disturbing the burrows of crustacean species in part of southern Lagunar Plain of the Rio Grande do Sul State, Brazil (Bond-Buckup *et al.* 2003); which may lead other vertebrate populations to be affected by the establishment of wild boars at Estação Ecológica de Itirapina such as *Clyomys bishopi*; an endemic rodent of open areas of the São Paulo Cerrado that is still classified as data deficient by IUCN (2010) and the armadillo species; which are important fossorial species in maintaining the biodiversity of the area. In conclusion, the presence or establishment of both exotic and invasive species probably cause damage to native species that in general already have populations affected by fragmentation and for this reason must be identified to help in design management strategies. Once Estação Ecológica de Itirapina is one of the last remaining open areas of the Cerrado of São Paulo state, Brazil, the first record of wild boar in the mentioned area can be useful to establish future local conservation strategies.

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